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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/932,749	08/17/2001	Yongfei Zhu	283014-00030	4614
27512	7590	03/01/2004	EXAMINER	
WILLIAM J. TUCKER 8650 SOUTHWESTERN BLVD. #2825 DALLAS, TX 75206			GLENN, KIMBERLY E	
			ART UNIT	PAPER NUMBER
			2817	

DATE MAILED: 03/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/932,749

Applicant(s)

ZHU ET AL.

Examiner

Kimberly E Glenn

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**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 July 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 11 and 13-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11 and 13-19 is/are allowed.
- 6) ☒ Claim(s) 20-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 20-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Das US Patent 5,459,123(of record) in view of Klee et al US Patent 6,125,027.

Das discloses figure 1, a loaded cylindrical cavity 141, a input coupling coil 2(probe), output coupling coil 3 (probe), a ferroelectric material 6, which acts as a variable capacitor loading the cylindrical cavity, a screw and a nut 9 (rod). When a bias voltage is applied to the ferroelectric material, the permittivity of the material changes resulting in a different resonant frequency for the cavity. The nut is serially connected to the ferroelectric material.

Figure 4 disclose four cylindrical cavities 141, 11, 21 and 31. The ferroelectric rods 6, 16, 26 and 46 are placed at the centers of the cavities. The ferroelectric rods are kept in place by screws 10, 20, 30, and 40 and bolts 9, 19, 29 and 49. The coaxial cables 36, 27 and 38 connect the cavities. Bias voltages V1 V2 V3 and V4 bias cavities 141,11, 21 and 31.

Thus, Das is shown to teach all the limitation of the claims with the exceptions of a the variable capacitor being selected from a group consisting of  $Ba_xCa_{1-x}TiO_3$  where x range

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between .2 to about .8,  $\text{Pb}_x\text{Zr}_{1-x}\text{TiO}_3$  where x range between 0 to about 1,  $\text{Pb}_x\text{Zr}_{1-x}\text{SrTiO}_3$  where x range between .05 to about .4,  $\text{KTa}_x\text{Nb}_{1-x}\text{O}_3$  where x range between 0 to about 1, lead lanthanum zirconium titanate (PLZT),  $\text{PbTiO}_3$ ,  $\text{BaCaZrTiO}_3$ ,  $\text{NaNbO}_3$ ,  $\text{KNbO}_3$ ,  $\text{LiNbO}_3$ ,  $\text{LiTaO}_3$ ,  $\text{PbNb}_2\text{O}_6$ ,  $\text{PbTa}_2\text{O}_6$ ,  $\text{KSr}(\text{NbO}_3)$ ,  $\text{NaBa}_2(\text{NbO}_3)\text{SKH}_2\text{PO}_4$  and mixtures and composition thereof or the variable capacitor being comprised of  $\text{Ba}_{1-x}\text{Sr}_x\text{TiO}_3$ , where x is from 0.3 to 0.7 in combination with at least one non-tunable dielectric phase selected from  $\text{MgO}$ ,  $\text{MgTiO}_3$ ,  $\text{MgZrO}_3$ ,  $\text{MgSrZrTiO}_6$ ,  $\text{Mg}_2\text{SiO}_4$ ,  $\text{CaSiO}_3$ ,  $\text{MgAl}_2\text{O}_4$ ,  $\text{CaTiO}_3$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{SiO}_2$ ,  $\text{BaSiO}_3$  and  $\text{SrSiO}_3$ ; and the variable capacitor including a substrate, a first electrode a tunable dielectric film on the first electrode and a second electrode position on the tunable dielectric film opposite the first electrode.

Klee et al disclose a capacitor comprising a substrate layer 1, for example glass or  $\text{Al}_2\text{O}_3$ , an anti-reaction layer or a leveling layer 2, a first electrode 3, a dielectric layer 4, and a second electrode S. The dielectric layer is composed of one or a combination the following dielectric materials listed starting at column 2 line, 60 through column 3 line 48 of the reference. Klee also states that it is alternatively possible to use layer structures which are composed of several individual layers of the above-mentioned compounds, such as a PZT-layer having a high titanium content on which PLZT-layers are provided, which results, in particular, in an improvement of the electrical properties of the layer.

One of ordinary skill in the art would have found it obvious to replace the dielectric rod acting as a ferroelectric capacitor of Das with art recognized equivalent the dielectric capacitor of Klee et al having the claimed dielectric material.

The motivation for this modification would have been to provide a more cost effective capacitor having a high surface capacitance, a small thickness and a low tolerance. (Column 1 line 61-65)

*Allowable Subject Matter*

Claims 11 and 13-19 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: With regards to claims 11 and 13-19 the prior art of record does not disclose or fairly teach a voltage tunable dielectric capacitor including  $Ba_xCa_{1-x}TiO_3$  where x is in the range from about 02 to about 08.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimberly E Glenn whose telephone number is (571)-272-1761. The examiner can normally be reached on Monday-Friday 7:30 to 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Pascal can be reached on (571)-272-1769. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



BENNY T. LEE  
PRIMARY EXAMINER  
ART UNIT 2817